Claims

1. A printing sleeve of multi-layer type, which has a printing layer, a compressible layer and a circumferential stiffening layer, characterized by the fact that stiffening layer (6) is provided between compressible layer (5) and printing layer (7).

2. A printing sleeve according to Claim 1, characterized by the fact that on the radially internal surface of compressible layer (5), the sleeve has film for facilitating removal (4).

3. A sleeve according to either Claim 1 or 2, characterized by the fact that the circumferential stiffening layer is a reinforcing layer (6) arranged on the compressible layer.

4. A printing sleeve according to one of Claims 1-3, characterized by the fact that in a thermoplastic or thermosetting polymer matrix, reinforcing layer (6) has reinforcing elements in the form of fibers or wires, a knit or fabric or screen.

5. A printing sleeve according to Claim 4, characterized by the fact that the reinforcing elements have a single directional arrangement and are oriented roughly circumferentially at least in the majority.

6. A printing sleeve according to either Claim 4 or 5, characterized by the fact that the matrix is present in the reinforcing layer in a proportion between 20-80 wt% of the layer, and the reinforcing elements are present in a proportion between 80-20 wt% of this layer.

7. A printing sleeve according to one of Claims 4-6, characterized by the fact that the reinforcing elements are made of carbon, glass, high modulus polyester, aramide.

8. A printing sleeve according to one of Claims 3-7, characterized by the fact that reinforcing layer (6) has a thickness between 0.2-0.5 mm.

9. A printing sleeve according to one of Claims 3-8, characterized by the fact that reinforcing layer (6) has a Young's modulus in the circumferential direction between 400-100,000 MPa, and preferably between 1000-2000 MPa.

10. A printing sleeve according to one of Claims 4-9, characterized by the fact that the matrix of reinforcing layer (6) has a Young's modulus between 50-1000 MPa.

11. A printing sleeve according to one of Claims 4-10, characterized by the fact that the elongation at break in the circumferential direction of the reinforcing layer is greater than 1.2% and preferably between 2-4%.

12. A printing sleeve according to one of Claims 4-11, characterized by the fact that the reinforcing layer has a Young's modulus in the radial direction between 50-500 MPa.

13. A printing sleeve according to one of Claims 4-12, characterized by the fact that the reinforcing layer has a Young's modulus in the direction parallel to its axis greater than 100 MPa.

14. A printing sleeve according to one of Claims 1-13, characterized by the fact that compressible layer (5) is formed by a thermoplastic or thermosetting elastomer base containing expanded microspheres or microspheres which are to be expanded and at least one expansion agent.

15. A printing sleeve according to Claim 14, characterized by the fact that compressible layer (5) is uniform in the form of one layer or several superposed under-layers of different compressibility if applicable.

16. A printing sleeve according to one of Claims 14 and 15, characterized by the fact that compressible layer (5) is produced by coating, spraying or spray gunning after the elastomer base is put in solution in a solvent.

17. A printing sleeve according to one of Claims 14 and 15, characterized by the fact that compressible layer (5) is formed by an elastomer base in the form of a rolled or extruded sheet, rolled over itself or in a helicoidal strip in order to obtain an endless layer.

18. A printing sleeve according to one of Claims 14 and 15, characterized by the fact that compressible layer (5) is a layer which is molded and calibrated in terms of thickness on removal facilitating film (4).

19. A printing sleeve according to one of Claims 14 and 15, characterized by the fact that compressible layer (5) is a layer which is molded and rectified after expansion.

20. A printing sleeve according to one of Claims 1-19, characterized by the fact that removal facilitating layer (4) is formed by an elastomeric or plastic polymer, such as an endless molded film or in the form of tube.

21. A printing sleeve according to one of Claims 1-19, characterized by the fact that removal facilitating layer (4) is produced during the manufacturing of the sleeve in the manner of a gel coat or a paint applied on the peripheral surface of the tube after a removal facilitating agent has been applied to this peripheral surface.

22. A printing sleeve according to one of Claims 1-19, characterized by the fact that removal facilitating layer (4) is in the form of a tube capable of heat shrinking.

23. A printing sleeve according to one of Claims 1-19, characterized by the fact that removal facilitating layer (4) is formed by a layer applied in the form of a powder by electrostatic or thermal projection.

24. A printing sleeve according to one of Claims 1-23, characterized by the fact that removal facilitating layer (4) has a very low degree of roughness in order to promote the operations of slipping the sleeve off and on the tube or a support sleeve.

25. A printing sleeve according to one of Claims 1-24, characterized by the fact that removal facilitating layer (4) has a modulus of 5-800 MPa and a thickness of 0.02-0.1 mm and a surface condition with an Ra factor less than 0.5 microns.

26. A printing sleeve according to one of Claims 1-25, characterized by the fact that removal facilitating layer (4) has a friction coefficient on steel or on composite resin between 0.2-0.5 and preferably in the vicinity of 0.3.

27. A printing sleeve according to one of Claims 1-26, characterized by the fact that printing layer (7) has a thickness less than 0.5 mm and preferably between 0.2-0.4 mm.